OmniAir Consortium, Inc.
1250 Connecticut Ave., NW, Suite 825
Washington, DC 20036

November 28, 2018

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW Room TWA325
Washington, DC 20554

Re: Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices In the 5 GHz Band (ET Docket No. 13-49)

Dear Ms. Dortch,

OmniAir Consortium® ("OmniAir") appreciates the opportunity to provide its input to the Commission in response to the October 28, 2018 *Public Notice* (DA 18-1111) seeking public comments regarding the recent report of Phase I testing of prototype U-NII-4 devices in the above-captioned proceeding.[1]

As further described below, OmniAir, its partners, and other industry leaders have achieved significant milestones in the development and deployment of Vehicle-to-Everything ("V2X") communications technologies and services, including those technologies and services using Dedicated Short-Range Communications ("DSRC") for "trusted" communications. This progress has occurred despite the several years' delay and uncertainty over the continued availability of the 5.9 GHz Band (5850-5925 MHz).

We urge the Commission to preserve the availability of the full 5.9 GHz allocation and reserve its availability for transportation safety applications, regardless of the underlying wireless transmission technology.

Moreover, based on our review of the Phase I Testing Report, we believe that the limited scope of laboratory testing in Phase 1 is inadequate to determine that it is safe for these transportation safety applications to share the band with unlicensed devices. The Commission is encouraged to undertake the planned Phase II and Phase III field testing, including field testing

[1] "Office of Engineering and Technology Requests Comment on Phase I Testing of Prototype U-NII-4 Devices," *Public Notice*, DA 18-1111 (rel. Oct. 28, 2018).

in the mobile environment, as soon as possible. OmniAir further recommends that this testing should be conducted using standards-compliant, certified devices.

I. Description and Mission of OmniAir Consortium

Established in 2004, OmniAir Consortium is a 501 (c)(6) industry association promoting interoperability and certification for Intelligent Transportation Systems ("ITS"), tolling, and Connected Vehicle technologies, including V2X. OmniAir's membership includes public agencies, private companies, research institutions, and independent test laboratories.

OmniAir Consortium's 68 members include many of the key stakeholders representing both public and commercial interests in the Connected Vehicle ecosystem: automotive OEMs, device manufacturers, Tier 1 Suppliers, chipset manufacturers, engineering firms, deploying agencies, test laboratories, test tool providers, and research institutions.[2]

Through its network of OmniAir Authorized Test Laboratories, OmniAir offers independent, third-party testing and certification for DSRC-V2X radios and RFID tolling tags and readers, using qualified test tools and validated test cases.

II. OmniAir Consortium's Interest in this Proceeding

OmniAir Consortium has a direct interest in this proceeding. As further described below, OmniAir has implemented and is currently operating a DSRC-based V2X radio device interoperability and conformance certification testing program.

Any Commission decision regarding spectrum sharing in the 5.9 GHz Band currently allocated to V2X communications will surely impact the deployment of DSRC and other radio technology devices for these critical transportation safety applications in the United States. OmniAir Consortium has previously participated in this proceeding.[3]

III. OmniAir's Activities

Since its inception, OmniAir Consortium has focused on the testing and certification programs for ITS, tolling, and connected vehicle technologies. OmniAir led the development of DSRC device qualification testing for the Safety Pilot Model Deployment in Ann Arbor, MI. OmniAir also led National Toll Interoperability Testing, in cooperation with the International Bridge, Tunnel and Turnpike Association ("IBTTA"), under a contract with the Federal Highway Administration ("FHWA"). In 2012, OmniAir started its first certification program for 6C-for-

[2] A list of OmniAir's members is provided in the attached Exhibit A.

[3] *See, e.g.*, OmniAir Consortium, *Comments*, ET Docket No. 13-49 (July 7, 2016); OmniAir Consortium, *Notice of Ex Parte Meeting*, ET Docket No. 13-49 (April 9, 2014), OmniAir Consortium, *Comments*, ET Docket No. 13-49 (May 28, 2013).

Tolling Program for tolling devices compliant with requirements based on ISO/EC 18000-6C (Type C) RFID protocol.

A. Connected Vehicle Conformity Assessment Program

In October 2017, OmniAir Consortium launched the world's first DSRC-V2X device certification program. OmniAir's Connected Vehicle Conformity Assessment ("CVCA") Program, is based on ISO-17065 certification body requirements and ISO-17067 certification scheme guidelines. The purpose of the CVCA Program is to verify the conformance of Connected Vehicle technology devices to industry-defined, standards-based requirements.

Companies completing certification may display the OmniAir Certified™ logo to demonstrate to consumers, customers and partners that they have created a high-quality device for "trusted" communications. Functionality, consistency and interoperability are key drivers of V2X deployment. OmniAir's CVCA Program plays a similar role to that of other certification bodies for wireless communications devices, ensuring conformance and interoperability, and faster deployment of vital services.

Device manufacturers seeking OmniAir certification present their devices to an OmniAir Authorized Test Laboratory for certification testing. OmniAir Authorized Test Laboratories must follow ISO standards for laboratory auditing and accreditation, using OmniAir Qualified Test Equipment, to ensure accuracy and consistency of test results.

In addition, each OmniAir Authorized Test Laboratory must prove it can execute the relevant protocol to test and verify user requirements of the underlying technology using qualified test equipment and test systems. To date, six test laboratories, five in the United States and one in Europe, have been authorized to provide CVCA Program interoperability and conformance certification testing services.[4]

This first-generation CVCA Program encompasses test case verification generated from key technical standards for DSRC-based V2X, including vehicle-to-vehicle ("V2V") and vehicle-to-infrastructure ("V2I"), wireless communications:

- 802.11p – Wireless Access in Vehicular Environments (WAVE) protocol stack[5] (DSRC)
- IEEE 1609 – Higher layer standard addressing Network Services, Security and Multi-Channel Operations.

[4] A list of the current OmniAir Authorized Test Laboratories is provided in the attached Exhibit B.

[5] IEEE 802.11p/WAVE is the successor interoperability standard to the Commission-adopted standard in the FCC's rules for DSRC in the 5.9 GHz Band: American Society for Testing and Materials (ASTM) E2213-03, Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems – 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications, published September 2003. *See* 47 CFR § 90.379.

- SAE J2735 – Dedicated Short Range Communications (DSRC) Message Set Dictionary
- SAE J2945/1 – Dedicated Short Range Communications (DSRC) Common Performance Requirements – V2V Minimum Performance
- FHWA-JPO-17-589 (RSU 4.1) – Roadside Unit Specification

The need for device certification is driven by ongoing deployments of DSRC-based V2X. For example, all DSRC devices used in the US Department of Transportation's ("USDOT") Connected Vehicle Pilot Deployment Projects in Tampa, New York City, and Wyoming are required to be certified. OmniAir has already certified multiple DSRC devices, with a number of additional devices expected to be certified in the coming months.

In addition, on November 16, 2018, OmniAir announced the award of a contract from the FHWA to provide "Next Generation V2X Certification." Specifically, OmniAir is charged with three tasks under the contract:

- Identify and define minimum security requirements for devices in the V2X ecosystem.
- Develop a coordination process among certification members, standards development organizations ("SDOs"), and USDOT to ensure that certification test suites remain in sync with the latest standards and market developments.
- Provide limited technical support to the USDOT (and its contractors) during the development and finalization of next generation V2X test procedures, particularly regarding identifying new test cases for V2I radio devices and connected infrastructure.

B. Connected Vehicle "Plugfests"

In support of its CVCA Program, OmniAir has organized a series of device "Plugfests" with member partners in San Francisco, Detroit and, most recently, in Texas. Each Plugfest is a week-long event where device manufacturers, test labs and test equipment manufacturers gather to conduct bench testing and field testing (on vehicles in closed tracks) of Connected Vehicle devices. The intent is to provide an informal and nonbinding process for participants to determine their prototype devices' readiness to seek OmniAir certification. Participants test in both bench and field environments for:

- Minimum radio performance
- Message conformance and interoperability
- High precision location-based testing
- Message security signing and authentication using multiple root-certificates
- Standards compliance testing: IEEE 802.11p Physical Layer, IEEE 1609.2 Security, IEEE 1609.3 Network, IEEE 1609.4 Multi-Channel Operations and SAE J2945.1 V2V Functionality.

- Roadside Unit SNMPv3 MIB Testing

OmniAir's three Plugfests to date have averaged some 150 attendees, with 25-30 DSRC devices tested at each event. In the most recent Plugfest, approximately one half of the devices tested were Roadside Units ("RSUs") and half were On-board Units ("OBUs"). Each of the vendors participating in Plugfest testing indicated they plan to deploy their V2X devices in the U.S. marketplace.

C. International Developments

OmniAir also is expanding its support activities for V2X internationally, specifically in China and South Korea. This Summer and Fall, OmniAir Consortium executed two Memorandum of Understandings ("MOUs") with industry associations in each country, the first MOU being with the China-ITS Industry Alliance and the second MOU with the Intelligent Transport Society of Korea.

The primary intent of these MOUs is for the parties to cooperatively develop a Connected Vehicle V2X certification program in each country to promote conformance and interoperability, based on OmniAir's CVCA Program. The MOUs envision the parties cooperating in several key supporting activities, including authorized test laboratories, additional Plugfests, and local requirements adaptation.

IV. Connected Vehicle Industry Developments

Both public and private stakeholders are aggressively deploying V2X applications using the 5.9 GHz spectrum. These efforts evidence the need for uncompromised access to the 5.9 GHz Band, safe from harmful interference.

A. V2X Deployments and Need for Certified V2X Devices

USDOT estimates that there are currently 70 active deployments of V2X communications utilizing the 5.9 GHz band. By the end of 2018, USDOT estimates there will be over 18,000 vehicles equipped with V2X DSRC devices and over 1,000 V2X DSRC roadside units deployed. All seven channels allocated for DSRC in the 5.9 GHz Band are actively utilized in these deployments.[6]

In addition to the three USDOT-sponsored Connected Vehicle pilots in Tampa, Wyoming, and New York City, State Departments of Transportation ("State DOTs") throughout the United States are using DSRC in the 5.9 GHz Band in operational deployments of V2I projects.

The Coalition for Safety Sooner ("CSS"), an *ad hoc* coalition of some 18 State and County DOTs, regional transportation planning organizations and other road infrastructure operators,

[6] US Department of Transportation, "Automated Vehicle 3.0: Preparing for the Future of Transportation," at p. 14 (rel. Oct. 4, 2018) (available at https://www.transportation.gov/av/3) (hereinafter "AV 3.0").

this past August provided its most recent summary list to the Commission of V2I projects using DSRC.[7] CSS confirms that there are 20 projects in 12 states where V2I devices have been deployed and are currently operational.[8] There are another 40 projects in 24 states using DSRC that have received funding and deployment is underway, but the projects are not yet operational.[9] These projects are deploying DSRC roadside units at dangerous intersections, along busy highway corridors, in buses and in emergency vehicles. These projects use DSRC to improve driver and passenger safety, to coordinate with traffic signals, and even to warn pedestrians.

For its part, USDOT states that the Department has invested some $700 million over the past 20 years in research and development funding for V2X, including for DSRC, in partnership with state, county and local governments as well as the private sector.[10] According to USDOT, these investments and partnerships are now paying off as V2X technologies and services are "on the verge of wide-scale deployment across the Nation."[11] USDOT further notes that V2V and V2X communications are also an "important complementary technology" for emerging autonomous vehicle technologies.[12]

Major, worldwide vehicle OEMs are currently deploying V2X applications using DSRC. Commercial vehicle interests are developing truck "platooning'' technologies using DSRC to enable trucks to follow closely one after another, which reduces fuel consumption and CO2 emissions, while improving traffic flow and safety.

In short, DSRC is being deployed – today – at the state, county, and local levels, all of which leverages the efforts of vehicle OEMs and others in the private sector to deploy V2X DSRC.

B. Emerging V2X Technology – Cellular V2X

Since the Commission opened this proceeding in 2013, another candidate V2X wireless transmission technology has significantly advanced. Cellular-V2X ("C-V2X") is based on the 3rd Generation Partnership Project (3GPP) Release 14 C-V2X direct communications (PC5) Mode 4, which is also referred to as LTE-V2X. There are significant similarities between DSRC and C-V2X as the latter reuses the established security and transport layers and application protocols defined for DSRC. Moreover, OmniAir anticipates providing interoperability and testing certification services for C-V2X devices as well as using the same test cases as developed for DSRC device certification.[13]

[7] Coalition for Safety Sooner, *Ex Parte Letter*, ET Docket No. 13-49 (submitted Aug. 13, 2018).
[8] *Id*.
[9] *Id*.
[10] AV 3.0 at 16.
[11] *Id*.
[12] Id. at 13.
[13] For example, at OmniAir's Plugfest in Detroit in May 2018, several companies demonstrated conformance bench testing of a C-V2X device using the same test cases for the upper (application layers) of the DSRC WAVE stack.

On November 21, 2018, the 5G Automotive Association ("5GAA"), filed a *Petition for Waiver* with the Commission seeking authorization to deploy C-V2X in the upper 20 MHz Channel of the 5.9 GHz Band (at 5905-5925 MHz).[14] The *Petition for Waiver* notes that the FCC's current rules do not permit non-DSRC technologies to offer transportation-related communications. 5GAA also indicates that it anticipates filing a complementary *Petition for Rulemaking* to formally modify the 5.9 GHz rules to enable C-V2X to operate in the 75 MHz in the band.

OmniAir takes no position at this time on the 5GAA *Petition for Waiver*; however, OmniAir cautions the Commission not to take any action in this proceeding that would prematurely prevent C-V2X development and deployment, such as closing off the 5.9 GHz Band to potential C-V2X operations in the future. Potential spectrum sharing with unlicensed operations in the 5.9 GHz is an important concern for any radio technology used.

V. 6 GHz Proceeding (ET Docket No. 18-295; GN Docket No. 17-183)

OmniAir also takes this opportunity to provide some initial comments on the recent Commission proceeding (ET Docket No. 18-295; GN Docket No. 17-183)[15] and the implications for possible unlicensed operations in the 5.9 GHz Band under consideration in ET Docket No. 13-49. The *6 GHz NPRM* is proposing as much as an additional 1200 MHz of spectrum for unlicensed operations, particularly for Wi-Fi using wider channel bandwidths and higher data rates. To date, unlicensed operations, including Wi-Fi, are authorized to operate in almost 700 MHz in the 2.4 GHz and 5 GHz Bands. A proposal to authorize as much as an additional 175 MHz in the 5 GHz Band (including the 75 MHz in the 5.9 GHz Band) is currently before the Commission in ET Docket No. 13-49.

While the explosive growth and benefits of Wi-Fi cannot be denied, authorizing an additional 1200 MHz for unlicensed devices raises the question whether the 75 MHz in the 5.9 GHz Band is still needed for Wi-Fi. The 5.9 GHz Band is currently allocated to V2V, V2I and V2X communications. Regardless of the underlying wireless communication technology (whether DSRC, C-V2X or another), there must be a "safe" home (*i.e.*, free from harmful interference) for these proven safety-of-life communications: between vehicles, between vehicles and the roadside, and between vehicles and pedestrians, bicyclists and others. Opening up the 6 GHz Band for Wi-Fi would appear to give more than enough spectrum to ensure the continued proliferation of these vital services. In short, OmniAir questions whether Wi-Fi still needs the 5.9 GHz Band.

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[14] 5G Automotive Association, "Petition for Waiver to Allow Deployment of Intelligent Transportation System Cellular Vehicle to Everything (C-V2X) Technology," *Petition for Waiver*, ET Docket No. __ (filed Nov. 21, 2018) (available at https://ecfsapi.fcc.gov/file/11212224101742/5GAA%20Petition%20for%20Waiver%20-%20Final%2011.21.2018.pdf).

[15] "In the Matter of Unlicensed Use of the 6 GHz Band; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz," *Notice of Proposed Rulemaking*, ET Docket No. 18-295; GN Docket No. 17-183, Doc. No. 18-147 (rel. Oct. 24, 2018) ("*6 GHz NPRM*").

VI. Comments on Phase I Testing Report

OmniAir notes that the Phase I testing reported initial positive bench testing results for validating the "detect and avoid" spectrum sharing proposal. Specifically, the report states that tested prototype unlicensed U-NII-4 devices are able to "detect" 10 MHz DSRC transmissions at thresholds of approximately -95 dBm, or higher, within the lower 4 DSRC channels on the 5.9 GHz Band.[16] In addition, the tested devices average time to "vacate" a channel varied from 9.7 ms to 798.0 ms (Cisco Detector), and 0.3 ms to 385.16 ms (KEA Detector).[17] It was also found that the higher the DSRC signal power (present in U-NII-4 DSRC detector path) corresponded with shorter times for devices to vacate and move to another channel.[18] As for the proposed "re-channelization" spectrum sharing proposal, it appears that DSRC devices operating in the upper 10 MHz channels 180, 182 and 184 experienced harmful interference.

OmniAir cautions, however, that the preliminary positive results for "detect and vacate" spectrum sharing proposal, conducted only in a laboratory environment, are not sufficient to justify a final decision that this mechanism will sufficiently protect V2X safety-of-life transmissions from harmful inference from unlicensed operations in the 5.9 GHz Band.

Field testing needs to confirm if the U-NII-4 devices can vacate a channel quickly enough for V2X safety-of-life communications to transmit.[19] OmniAir therefore urges the FCC to move forward as quickly as possible on the planned Phase II and Phase III testing using OmniAir Certified™ devices.

The FCC, along with USDOT, National Telecommunications and Information Administration, and other stakeholders in these tests, should leverage existing DSRC deployments and use certified standards-compliant devices for the planned field testing. Regardless, V2X deployment efforts using DSRC will surely continue apace.

A decision now to permit sharing in the 5.9 GHz Band without the Phase II and Phase III testing would delay deployments of V2X safety applications. Automakers, industry and USDOT have spent over 10 years to develop and validate V2X safety applications and prove their efficacy in the licensed spectrum free from potential harmful interference from unlicensed devices. Much of the same validation and testing of V2X applications would have to be repeated if unlicensed devices were to be permitted to share the 5.9 GHz Band without the additional field and system level testing expected to be covered in Phase II and Phase III.

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[16] Federal Communications Commission, "Report: TR 17-1006, Phase I Testing of Prototype U-NII-4 Devices," DA 18-1111AA2, at 17 (rel. Oct. 22, 2018) (available at https://ecfsapi.fcc.gov/file/1029334616006/DA-18-1111A2.pdf).

[17] *Id*. at 18.

[18] *Id*.

[19] Table 22 indicates that the average "channel move time" for Cisco U-NII-4 prototype devices could be as high as 800 msec, which could result in a channel access delay for DSRC that would appear to qualify as harmful interference. *Id*. at 187.

VII. Conclusion

In sum, V2X has made significant progress over the past five years reaching the state where an industry-driven certification program is established to accelerate deployments. DSRC is being deployed today in numbers that are already benefiting the traveling public. Recent C-V2X developments also are encouraging. V2X technologies have already shown that they can provide safer and more efficient automotive travel. The stakes are high: Every year in the United States there are more than 37,000 automotive fatalities[20] and 6.9 billion hours in traffic congestion delays.[21] More efficient use of existing roadways from improved automotive safety technology will also reduce both vehicle emissions and the need to construct costly new capacity.

However, it is still premature for the Commission to make a final determination that spectrum sharing in the 5.9 GHz Band can be realized while protecting critical transportation safety messages from harmful interference. OmniAir encourages the Commission to conduct the planned Phase II and Phase III testing as soon as possible. Ultimately, any Commission decision needs to ensure that there is "safe" spectrum for V2V communications regardless of the underlying radio technology.

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Respectfully submitted,

/s/ Jason M. Conley

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[20] Bureau of Transportation Statistics Table 2-19 "Occupant Fatalities by Vehicle Type and Nonoccupant Fatalities" (available at https://www.bts.gov/content/occupant-fatalities-vehicle-type-and-nonoccupant-fatalities).

[21] Texas A&M Transportation Institute "2015 Urban Mobility Scorecard", Exhibit 1 (available at https://static.tti.tamu.edu/tti.tamu.edu/documents/mobility-scorecard-2015.pdf).

EXHIBIT A – OmniAir Consortium Members

Executive Members

3M
7Layers
AECOM
ATKINS
Austin Department of Transportation
Blackberry
E-470
E-ZPass/IAG Group
HNTB
INTEGRITY Security Services
Kapsch
Marvell
MET Labs
Metric Engineering
Metropolitan Transportation Commission
MTA Bridges and Tunnels
North Texas Tollway Authority
Panasonic
Port Authority of New York and New Jersey
Qualcomm
Savari
Southwest Research Institute
TransCore
UL

Associate Members

ALPS
Aptiv
Autotalks
Bureau Veritas
Carma
Chemtronics
Cohda Wireless
Commsignia
Danlaw
DEKRA
DENSO
ESCRYPT
eSSys
GeoToll
GM
Hitachi
IBI Group
Intertek
Invengo
It-Telecom
KATECH
KETI
Keysight
Lear
LG
NXP
OnBoard Security
Orange Traffic
Penta Security
Rohde & Schwarz
SGS
Siemens
SiriuxXM
Spirent
Star Systems
TTA
Toyota
TUV SUD
u-blox
Vector
Veniam
Visteon
Wayties
WS

EXHIBIT B – OmniAir Authorized Test Laboratories

7Layers	Irvine, CA
DEKRA	Malaga, Spain
INTERTEK	Lexington, KY
MET Laboratories	Baltimore, MD [22]
SGS	San Diego, CA
UL	Novi, Michigan

[22] OmniAir Authorized Test Laboratory for RFID Tolling only. All other laboratories are authorized for testing of DSRC-V2X Radios.